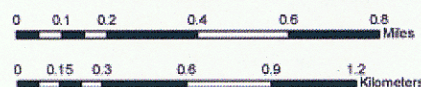


Geologic data from Patterson, 1992, "Surficial Geology" in Meyer and Swanson, 1992, "Geologic Atlas-Ramsey County, Minnesota" Minnesota Geological Survey County Atlas Series Atlas C-7.



HOLOCENE

- sh** Stream Sediments - Sand and gravel with areas of fine sediment and organic material (slack-water deposits)
- oh** Organic Sediments - Includes peat, shallow lakes, and marshes. Some deposits, identified from older maps and air photographs, may now be excavated and/or artificially filled.
- hh** Hillside Sediments - Deposits on and at base of steep slope. Angular bedrock fragments, with silt and clay where bedrock is exposed, slumped till where till forms slope.

PLEISTOCENE

- sw** Stream Sediment of Glacial River Warren - Sand and gravel with some fine sediment (silt and clay). Forms terraces of the Mississippi River. Generally less than 20 ft thick but as much as 40 ft over Paleozoic bedrock and 100-200 ft thick in part of terrace in downtown St. Paul.

Deposits Associated with the Grantsburg Sublobe

- sg** Meltwater Stream Sediment - Medium to coarse sand with pebbles. Sand predominantly quartz; distinguished from Superior lobe sand by presence of Cretaceous shale, limestone, and rare lignite grains. Shale and lignite common in coarse-sand fraction; may be concentrated in layers. In channels and outwash plains.

- tg** Till - Typically loam-textured till; ranges from loamy sand to clay. Gray, oxidizes to yellow brown. Commonly banded with reddish-brown Superior lobe till or sand. Thick yellow-brown (or gray) bands, with thin red stringers, near land surface; with depth, yellow bands thin as red layers thicken.

- tmg** Till with Stream-Modified Surface - Till topography modified by running water; locally fluvial eroded and streamlined. Covered in some places with thin, discontinuous sand and gravel. In other respects, texture similar to map unit tg.

Deposits Associated with the Superior Lobe

- ts** Till - Texture commonly sandy loam; in some places, clay loam to silty clay. Reddish brown. Locally compact. Fabric visibly expressed by clast orientation. Till surface not extensively or deeply pitted, although difficult to judge in highly urbanized areas.

- tms** Till with Stream-Modified Surface - Till topography modified by flowing water. Till prominences commonly form low, streamlined hills (former bars in channels). Covered in some places by thin, discontinuous deposits of sand and gravel; in other respects, similar to map unit ts.

PREGLACIAL DEPOSITS

- b** Exposed or Near-surface Paleozoic Bedrock - Typically on steep slopes and terraces along the Mississippi River.

FIGURE 14
Surficial Geology
High Bridge Repowering Project
Docket 05-91-PPS-Xcel Energy HB